

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently amended) An arrhythmia discrimination method, comprising:

sensing electrocardiogram signals at a subcutaneous non-intrathoracic location;
receiving signals associated with a non-electrophysiological cardiac source, the received signals comprising at least one of heart sound signals, pulse oximetry signals, impedance signals indicative of cardiac activity, acoustic emission information, blood-flow information, and heart rate information;

verifying that the electrocardiogram signals comprise a cardiac signal using the non-electrophysiological signal;

discriminating, using the electrocardiogram signals and non-electrophysiologic signals, between a normal sinus rhythm and a cardiac arrhythmia; and

withholding delivery of subcutaneous non-intrathoracic cardiac stimulation therapy if the sensed electrocardiogram signals do is not comprise the cardiac signal.

2. (Original) The method of claim 1, wherein discriminating between normal sinus rhythm and the arrhythmia comprises:

detecting the arrhythmia using the electrocardiogram signals; and

verifying presence of the arrhythmia using the non-electrophysiologic signals.

3. (Original) The method of claim 1, wherein discriminating between normal sinus rhythm and the arrhythmia comprises:

detecting the arrhythmia using the electrocardiogram signals;

determining temporal relationships between the electrocardiogram signals and non-electrophysiologic signals received while detecting the arrhythmia; and

verifying presence of the arrhythmia based on the temporal relationships between the electrocardiogram signals and non-electrophysiologic signals.

4. (Original) The method of claim 1, wherein discriminating between normal sinus rhythm and the arrhythmia comprises:

initiating a detection window in response to receiving each electrocardiogram signal of a succession of the electrocardiogram signals; and

determining whether each non-electrophysiologic signal of a succession of the non-electrophysiologic signals is received at a time falling within the detection window.

5. (Original) The method of claim 1, wherein discriminating between normal sinus rhythm and the arrhythmia comprises:

computing a first rate based on successive electrocardiogram signals;

computing a second rate based on successive non-electrophysiologic signals; and

discriminating between normal sinus rhythm and the arrhythmia using the first and second rates.

6. (Original) The method of claim 1, wherein discriminating between normal sinus rhythm and the arrhythmia comprises:

computing a first rate based on successive electrocardiogram signals;

computing a second rate based on successive non-electrophysiologic signals;

comparing the first rate with a first arrhythmia threshold;

comparing the second rate with a second arrhythmia threshold; and

determining presence of the arrhythmia in response to both the first and second rates exceeding the first and second arrhythmia thresholds, respectively.

7. (Original) The method of claim 1, wherein discriminating between normal sinus rhythm and the arrhythmia comprises:

computing a first rate based on successive electrocardiogram signals;

computing a second rate based on successive non-electrophysiologic signals;

comparing the first rate with a first arrhythmia threshold;

comparing the second rate with a second arrhythmia threshold; and
determining absence of the arrhythmia in response to the first rate exceeding the first arrhythmia threshold and the second rate failing to exceed the second arrhythmia threshold.

8. (Original) The method of claim 1, wherein discriminating between normal sinus rhythm and the arrhythmia comprises:

determining presence of the arrhythmia using a morphology of the electrocardiogram signals; and

verifying presence of the arrhythmia using the non-electrophysiologic signals.

9. (Canceled).

10. (Original) The method of claim 1, wherein the non-electrophysiologic signals comprise subsonic acoustic signals indicative of cardiac activity.

11. (Original) The method of claim 1, wherein the non-electrophysiologic signals comprise pulse pressure signals.

12-13. (Canceled)

14. (Original) The method of claim 1, further comprising declaring an arrhythmic episode in response to detecting the arrhythmia using the electrocardiogram signals and detecting the arrhythmia using the non-electrophysiologic signals.

15. (Original) The method of claim 1, further comprising enabling defibrillation therapy delivery in response to detecting the arrhythmia using the electrocardiogram signals and detecting the arrhythmia using the non-electrophysiologic signals.

16. (Original) The method of claim 1, further comprising inhibiting defibrillation therapy delivery in response to detecting the arrhythmia using the electrocardiogram signals but not detecting the arrhythmia using the non-electrophysiologic signals.

17. (Currently amended) An arrhythmia discrimination method, comprising:

- sensing an electrocardiogram signal at a subcutaneous non-intrathoracic location;
- receiving a signal associated with a non-electrophysiological cardiac source;
- verifying that the sensed electrocardiogram signal comprises a cardiac signal using the non-electrophysiological cardiac signal;
- detecting a cardiac arrhythmia using one of the sensed electrocardiogram signal and the verified cardiac signal;
- confirming the detection of the cardiac arrhythmia by performing a correlation between the electrocardiogram signal and the non-electrophysiological cardiac signal; and
- withholding treatment of the cardiac arrhythmia if the sensed electrocardiogram signal is does not comprise the cardiac signal.

18. (Currently amended) The method of claim 17, further comprising:

- defining a detection window with a start time associated with an inflection point of the electrocardiogram signal; and
- evaluating the received non-electrophysiological cardiac signal within the detection window.

19. (Original) The method of claim 18, wherein the start time of the detection window is associated with a maxima or a minima of the electrocardiogram signal.

20. (Currently amended) The method of claim 17, further comprising:

- computing a first heart-rate based on intervals between successive electrocardiogram signals; and

computing a second heart-rate based on intervals between successive non-electrophysiological cardiac signals;

wherein confirming ~~presence~~ the detection of the cardiac arrhythmia comprises comparing the first heart-rate to the second heart-rate.

21. (Canceled)

22. (Original) The method of claim 17, wherein the non-electrophysiological cardiac signal comprises acoustic emission information.

23. (Currently amended) The method of claim 22, wherein the acoustic emission information comprises a temporal location of a peak heart-sound.

24. (Original) The method of claim 17, wherein the non-electrophysiological cardiac signal comprises cardiac acceleration information.

25. (Original) The method of claim 17, wherein the non-electrophysiological cardiac signal comprises pulse pressure information.

26. (Original) The method of claim 17, wherein the non-electrophysiological cardiac signal comprises blood-flow information.

27. (Original) The method of claim 17, wherein the non-electrophysiological cardiac signal comprises heart rate information.

28. (Original) The method of claim 17, wherein the non-electrophysiological cardiac signal comprises pulse oximetry information.

29. (Currently amended) The method of claim 17, wherein detecting ~~presence or non-presence~~ of the cardiac arrhythmia comprises performing a rate based analysis of the electrocardiogram signal.

30. (Currently amended) The method of claim 17, wherein detecting ~~presence or non-presence~~ of the cardiac arrhythmia comprises performing a morphology based analysis of the electrocardiogram signal.

31. (Original) The method of claim 17, further comprising delivering a cardiac therapy to treat the cardiac arrhythmia.

32. (Currently amended) An implantable cardiac device, comprising:

- an implantable housing;
- an electrode arrangement configured for subcutaneous non-intrathoracic placement;
- detection circuitry provided in the housing and coupled to the electrode arrangement, the detection circuitry configured to detect electrocardiogram signals;
- a sensor configured to sense signals associated with a non-electrophysiological cardiac source, the sensor comprising at least one of a microphone, acoustic transducer, blood-flow transducer, pulse oximeter, and photoplethysmography circuitry;
- energy delivery circuitry coupled to the electrode arrangement; and
- a processor provided in the housing and coupled to the detection circuitry, sensor, and energy delivery circuitry, the processor using the non-electrophysiological signals to verify that the detected electrocardiogram signals comprise a cardiac signal, the processor withholding treatment of the cardiac arrhythmia if the detected electrocardiogram signals do not comprise the cardiac signal.

33. (Original) The device of claim 32, wherein the energy delivery circuitry comprises defibrillation therapy circuitry.

34. (Original) The device of claim 32, wherein the energy delivery circuitry comprises pacing therapy circuitry.

35. (Original) The device of claim 32, wherein the sensor is provided in or on the housing.

36. (Original) The device of claim 32, wherein the sensor is provided in or on a lead coupled to the housing.

37. (Original) The device of claim 32, wherein the sensor comprises an accelerometer.

38-45. (Canceled)